SLOVENSKI STANDARD
SIST HD 627 S1:1998/A1:2002

01-april-2002

Večžilni in večparni kabli za nadzemno in podzemno inštalacijo

Multicore and multipair cables for installation above and below ground

Vieladrige und vielpaarige Kabel für die Verlegung in Luft und in Erde

Câbles multiconducteurs et multipaires pour installation dans l'air et dans le sol

Ta slovenski standard je istoveten z: **HD 627 S1:1996/A1:2000**

ICS:

29.060.20 Kabli Cables

SIST HD 627 S1:1998/A1:2002 **en**

HARMONIZATION DOCUMENT **HD 627 S1/A1**

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English version

Multicore and multipair cable for installation above and below ground

Câbles multiconducteurs et multipaires pour installation dans l'air et dans le sol

Vieladrige und vielpaarige Kabel für die Verlegung in Luft und in Erde

This amendment A1 modifies the Harmonization Document HD 627 S1:1996; it was approved by CENELEC on 1999-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this amendment on a national level.

Up-to-date lists and bibliographical references concerning such national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in two official versions (English, French).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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FOREWORD

This amendment to HD 627 S1:1996 has been prepared by WG9 of CENELEC TC20 "Electric Cables". CENELEC TC20 confirmed at its Barcelona meeting (May 1998) that the amendment should go to the Unique Acceptance Procedure.

A list of additions and amendments to the particular sections of Parts 3-7 is given in this Part 0.

NOTE: During the preparation of this amendment, IEC 502 (4th edition) has been replaced by IEC 60502-1 and IEC 60502-2, HD 405.1 and HD 405.2 have been superseded by EN 50265, IEC 60754-1 and HD 602 have been superseded by EN 50267.

In general the updating of these references has not been included in this amendment unless a complete section has been introduced or replaced. Users should refer to these new editions for the most up-to-date information.

The draft was submitted to the Unique Acceptance Procedure in October 1998 and was approved by CENELEC as amendment A1 to HD 627 S1:1996 on 1999-08-01 .

The following dates were fixed:

–	latest date by which the existence of the amendment has to be announced at national level	(doa)	2000-02-01
–	latest date by which the amendment has to be implemented at national level by publication of a harmonized national standard or by endorsement	(dop)	2001-05-01
–	latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2001-08-01

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PART 6 Multicore and multipair halogen-free cables complying with HD 405.1

6-E: 450/750V multicore cables with common screen

PART 7 Multicore and multipair halogen-free cables complying with HD 405.3 or similar

7-A1: Multicore cables with copper conductors, single wire armoured and unarmoured with non-halogenated sheath
7-A2: Multipair cables with copper conductors single wire and double steel tape armoured with non-halogenated sheath
7-B1: 500V multiquad cables with a metallic covering
7-B2: 750V multicore cables with a metallic covering
7-D1: 450/750V multicore cables without screen
7-D2: 450/750V multicore cables with concentric conductor
7-F1: 1kV XLPE insulated and non-halogenated sheathed multicore cables
7-F2: 300V armoured and unarmoured XLPE insulated and non-halogenated sheathed and screened instrumentation cables
7-G: Cables in pairs, triples and quads with copper conductors, metallic screen and having halogen free all-non-metallic components
7-H(2): 0.6/1kV XLPE insulated multicore cables with or without concentric conductor
7-K: 150V multicore and multipair cables with and without a metallic covering
7-L1: Cables in pairs and triples and multicore cables with circular copper conductors and metallic covering
7-L2: Multipair and multicore cables with circular copper conductors for plug-in connections
7-M: EPR or XLPE insulated and ZH sheathed multicore cables and polyethylene insulated and ZH sheathed multipair cables

NOTES: (1) Amendment A1 introduces some changes to the text
(2) Amendment A1 completely revises the Particular Section
(3) New section introduced by amendment A1

SECTION K

MULTIPAIR AND MULTIQUAD CABLES WITH COPPER CONDUCTORS, SOLID OR CELLULAR POLYETHYLENE INSULATED, WITH OR WITHOUT LONGITUDINAL AND/OR RADIAL WATERTIGHTNESS, WITH ARMOUR AND POLYVINYL CHLORIDE OR POLYETHYLENE SHEATHED

Introduce new Section K of Part 3 as attached.

SECTION K

MULTIPAIR AND MULTIQUAD CABLES WITH COPPER CONDUCTORS, SOLID OR CELLULAR POLYETHYLENE INSULATED, WITH OR WITHOUT LONGITUDINAL AND/OR RADIAL WATERTIGHTNESS, WITH ARMOUR AND POLYVINYL CHLORIDE OR POLYETHYLENE SHEATHED

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REFERENCES

Section K of Part 3 of HD 627 incorporates by dated or undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to Section K of Part 3 of HD 627 only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 60811	Common test methods for insulating and sheathing materials of electric cables.
EN 50265-2-1	Common test methods for cables under fire conditions - Test for resistance to vertical flame propagation for a single insulated conductor or cable. Part 2-1: Procedures - 1 kW pre-mixed flame.
HD 605	Electric cables - Additional test methods.
HD 608	Generic specification for symmetric pair/quad and multicore cables for digital communication.
HD 624.8	Materials used in communication cables - Part 8: Filling compounds for filled cables.

1. Scope

This section specifies general and dimensional requirements for multipair or multiquad control and instrumentation cables, solid or cellular polyethylene insulated, with or without longitudinal and/or radial watertightness, with armour, polyvinyl chloride or polyethylene sheathed.

The maximum operating voltage is 500 V.

There are four types of cables:

Type of cables	A	B	C	D
Scope	control and instrumentation			
Symbol	(T)	(T)	(T)	(T)
Conductor diameter (mm)	0,6/0,8/1,0/1,4	0,8	0,8	1,0
Insulation	solid polyethylene			cellular polyethylene
Symbol	(W)	(W)	(W)	(Wfs)
Cabling element	pair	quad	quad	quad
Presence of longitudinal watertightness	-	petroleum jelly		
Symbol	-	(PJ)	(PJ)	(PJ)
Presence of radial watertightness	lead sheath	-	-	alu.tape
Symbol	(L) (if any)	-	-	(Al)
Inner sheath	-	polyethylene		
Symbol	-	(W)	(W)	(W)
Armour	steel wire or tapes	steel tapes		
Symbol	(A)	(A)	(A)	(A)
Outer sheath	polyvinyl chloride		polyethylene	
Symbol	(V)	(V)	(W)	(W)

2. Additional general requirements

The following requirements shall be read with those given in Part 1 of this HD.

2.1 Core identification

The core identification is realised by colouration of the insulation.

The colours in the cabling elements of the different layer are defined hereafter:

Type of cabling element	Core			
	a	b	c	d
R (pilot)	orange	blue	grey	white
D (direction)	orange	green	grey	white
A	yellow	blue	grey	white
B	red	green	grey	white

If the cabling element is a star quad, the cores "a" and "b" on the one hand and "c" and "d" on the other hand are opposite in the quad.

The identification in each layer is based on the following sequence:

- Number of cabling element in the layer

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,.

- Type of cabling element

R, D, A, B, R, A, B, A, B, R, A, B,..

In the layer having a number of cabling elements equal to a multiple of 5, the last cabling element of type R is replaced by a cabling element of type A.

2.2 Marks and indications

(a) The outer sheath of the cables shall be embossed or indented with the following legends:

- identification of manufacturer;
- code designation as defined in clause 3;
- year of manufacture;
- marking each metre of the length;

(b) A metric tape graduated in metres and decimetres shall be placed inside the cable in case of need.

2.3 Test requirements

2.3.1 Tests on the insulation

In addition to the tests for which methods and requirements are defined in table 1, the following test shall be carried out:

(a) Test for shrinkage during soldering

This test is only applicable to solid polyethylene insulated cores.

A sample of core with a total length of about 200 mm shall be stripped at one end for a length of 20 mm.

The stripped core shall be immersed for a length of 7 mm for 15 seconds in a soldering bath at a temperature of (260 ± 10)°C.

During the test, the insulation shall not have a shrinkage larger than 2 mm.

No crack, fissure or damage shall appear during or after the test.

2.3.2 Tests on the sheath

The test methods and requirements are defined in tables 2 and 3.

2.3.3 Tests on cables

The test methods are defined in table 4 and the requirements are stipulated hereafter:

2.3.3.1 Maximum d.c. loop resistance at 20°C

- Conductor diameter 0,6 mm : 133 Ω/km
- Conductor diameter 0,8 mm : 73,6 Ω/km
- Conductor diameter 1,0 mm : 47,0 Ω/km
- Conductor diameter 1,4 mm : 23,6 Ω/km

Verification shall be according to HD 605 sub-clause 3.1.1, with two conductors of the pair bonded at one end.

2.3.3.2 Insulation resistance at 20°C

The insulation resistance shall not be less than 5000 MΩ.km when the test is carried out according to the sub-clause 3.3.2 of HD 605.

2.3.3.3 **A.C. capacitance**

The measurement shall be carried out according to HD 627, Part 2, sub-clause 2.2.

Type A cables
- mean capacitance : ≤ 55 nF/km
- individual capacitance : ≤ 60 nF/km
-

Types B and C cables
- mean capacitance : ≤ 45 nF/km
- individual capacitance : ≤ 50 nF/km

Type D cables
- mean capacitance : ≤ 38 nF/km
- individual capacitance : ≤ 40 nF/km

NOTE: The mean value shall not be considered for cables with less than 20 pairs/10 quads.

2.3.3.4 **Capacitance unbalance**

The measurement shall be carried out according to HD 627, Part 2, sub-clause 2.3.

The capacitance unbalance measured on a cable length of L (m) shall not be more than the values mentioned hereafter in pF:

(a) between pairs of the same quad ... max.: 250 x L/500

(b) between pairs .... mean : $100 \times \sqrt{\frac{L}{500}}$
.... max.: 200 x L/500

(c) between pairs of the outer layer and metallic screen .... max.: 800 x L/500

For cable lengths less than 100 m, consider L = 100 in the above formula.

NOTE: The mean value shall not be considered for cables with less than 20 pairs/10 quads.

2.3.3.5 **Line attenuation**

This test is only applicable to the cables of type D.

The measurement shall be carried out according to HD 608, sub-clause 3.3.2. The line attenuation shall not be more than the values stipulated hereafter:

- at f = 800 Hz : 0,55 dB/km
- at f = 1MHz : 9 dB/km

2.3.3.6 **High voltage test**

(a) **Between conductors and between conductors and all metallic elements connected together**

An a.c. test voltage at industrial frequency shall be applied for 2 minutes. No breakdown shall occur.

Type of cable	A	B	C	D
Voltage test between conductors	750 V	1 500 V	1 500 V	750 V
Voltage test between conductors and all metallic elements connected together	2 000 V	5 000 V	10 000 V	2 000 V

(b) **Outer sheath**

The non-metallic outer sheath shall be submitted to a spark test with the earth connected to the metallic screen for an a.c. test or with the metallic screen connected to the negative pole for a d.c. test. The voltages are 6 kV a.c. or 9 kV d.c. per millimetre of nominal thickness of the outer sheath with a maximum of respectively 15 kV and 25 kV.

The time for the cable to pass through the electrode shall be long enough in order that each fault can be detected.

Alternatively, the test can be realised by immersion of the cables in water for a sufficient time and in all cases for at least 2 hours. The a.c. applied between the screen and the water for 1 minute, shall be equal to 4 kV per millimetre of nominal thickness of the sheath with a maximum of 12 kV.

No breakdown shall occur.

2.3.3.7 **Longitudinal watertightness**

This test is only applicable to the cables of types B, C and D.

The verification shall be carried out according to HD 627, Part 2, sub-clause 3.2.

2.3.3.8 **Reduction factor**

(a) General

This test is only applicable to the cables of types B, C and D.

The measurement shall be carried out according to the test method described in b) below.

The reduction factor shall be not more than the values stipulated hereafter:

Electromotive force	Type of cable Reduction factor	
V/km	B and C	D
80	-	0,20
200	0,55	0,20
300	-	0,20
350	0,68	0,22
400	-	0,26
450	-	0,30
500	0,80	0,34
550	-	0,37
600	-	0,42
700	-	0,65
800	-	1,00

(b) Test method